

## WHAT IS CLAIMED IS:

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1. A method for imaging an organ of a patient comprising the steps of:  
scanning a volume of a patient's body including an organ of the patient with a computed tomographic (CT) imaging system having a radiation source and detector coupled to a rotating gantry, the detector array having a z-direction parallel to an axis of rotation of the gantry and an x-direction transverse to the z-direction;  
acquiring attenuation data from a plurality of staggered half detector segments of the detector array; and  
reconstructing an image including the patient's organ using the acquired attenuation data.

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10 2. A method in accordance with Claim 1 wherein said step of acquiring attenuation data comprises acquiring attenuation data having different resolutions as a function of position in the x-direction in each said half detector segment.

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*Sub A* 15 3. A radiation detector for an imaging system, said radiation detector having a centerline and comprising a plurality of staggered half detector segments abutted in regions about said centerline, said staggered half detector segments each comprising a plurality of detector modules.

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20 4. A radiation detector in accordance with Claim 3, wherein said staggered half detector segments comprise at least a first type of module and a second type of module, said first type of module having flexible cables extending therefrom in two directions and said second type of module having flexible cable extending in one direction.

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5. A radiation detector in accordance with Claim 4 wherein said second type of module straddles the centerline in each half detector segment.

6. A radiation detector in accordance with Claim 5 wherein said flexible cable of said second type of module includes a pre-formed right angle bend.

5 7. A radiation detector in accordance with Claim 3 wherein said radiation detector has an x-direction and a z-direction, and said first type of detector

modules are configured to provide different numbers of outputs per module as a function of location in the x-direction.

8. A radiation detector in accordance with Claim 7 wherein said first type of detector modules comprise detector modules having a plurality of detector cells extending in the x-direction and the z-direction, including paired cells.

9. A radiation detector in accordance with Claim 3 wherein said staggered half detector segments comprise at least a first type of detector module and a second type of detector module, said first type of detector module having flexible cables extending therefrom in two directions and said second type of detector module having flexible cable extending in one direction, and a set of rails to which said first type of detector module and said second type of detector module are mounted, said rails extending in front of said first type of detector modules and behind said second type of detector modules.

20 10. A detector array in accordance with Claim 9 and further comprising a set of collimator plates extending in a z-direction, said collimator plates including collimator plates extending over a single said detector module of said first type and collimator plates extending over a plurality of said detector modules of said second type.

11. A detector array in accordance with Claim 3 wherein said detector modules are removable.

25 ~~12. A computed tomographic (CT) imaging system for imaging an organ of a patient, said CT system comprising:~~

~~a rotating gantry having an axis of rotation (z-axis);~~

a radiation source configured to rotate with the rotating gantry; and

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and configured to acquire attenuation data from a patient between the radiation source and the detector, said detector array comprising a plurality of staggered half-detector segments and configured to provide attenuation data having a relatively higher spatial resolution near a centerline of said detector array and a relatively lower spatial resolution distal to said centerline,

10 a data acquisition system configured to receive attenuation data from the detector, including the relatively lower spatial attenuation data and the relatively higher spatial resolution attenuation data, and

an image reconstructor configured to utilize the attenuation data to reconstruct an image of the organ, including utilizing the relatively lower spatial resolution data, to thereby reduce artifacts in the image.

13. A CT imaging system in accordance with Claim 12 wherein said staggered half detector segments comprise at least a first type of module and a second type of module, said first type of module having flexible cables extending therefrom in two directions and said second type of module having flexible cable extending in one direction.

20 14. A CT imaging system in accordance with Claim 13 wherein said second type of module straddles the centerline in each half detector segment.

15. A CT imaging system in accordance with Claim 14 wherein said flexible cable of said second type of module includes a pre-formed right angle bend.

25 16. A CT imaging system in accordance with Claim 12 wherein said radiation detector has an x-direction and a z-direction, and said first type of detector modules are configured to provide different numbers of outputs per module as a function of location in the x-direction.

17. A CT imaging system in accordance with Claim 16 wherein said first type of detector modules comprise detector modules having a plurality of detector cells extending in the x-direction and the z-direction, including paired cells.

18. A CT imaging system in accordance with Claim 12 wherein said staggered half detector segments comprise at least a first type of detector module and a second type of detector module, said first type of detector module having flexible cables extending therefrom in two directions and said second type of detector module having flexible cable extending in one direction, and a set of rails to which said first type of detector module and said second type of detector module are mounted, said rails extending in front of said first type of detector modules and behind said second type of detector modules.

19. A CT imaging system in accordance with Claim 18 and further comprising a set of collimator plates extending in a z-direction, said collimator plates including collimator plates extending over a single said detector module of said first type and collimator plates extending over a plurality of said detector modules of said second type.

20. A CT imaging system in accordance with Claim 12 wherein said detector modules are removable.

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